Cytology of Neottia Nidus-avis.—A paper by MODILEVSKI,[17] dated 1918, has just reached this country from Kiev, Russia. The paper is in Russian, but has a rather complete summary and an explanation of figures in English. The cytological part deals principally with the behavior of the chromatin during the two reduction divisions in oogenesis. Particular attention was given to the character of the spirem thread, and the conclusion was reached that no true double structure is present either before synapsis, during synapsis, or immediately after, although in rare cases a parallel orientation could be seen in the late spirem stage. Before the diakinesis stage is reached, a double character is easily observed, and eighteen bivalent chromosomes are formed, some of which are larger than others. One of the bivalents is much longer than the rest, and is conspicuous during the subsequent stages of division. MODILEVSKI believes that in structure the chromosomes are masses of threads, and that there is no vacuolization, like that described by GREGOIRE and many others. Besides the long chromosome, there are three others which are morphologically different from the remaining fourteen chromosomes; however, he does not seem to think that this situation has any serious value for theoretical considerations. Reduction was also studied in the pollen mother cell.

Some attention is given to the nucleolus, which he thinks consists of two distinct morphological and chemical constituents. One element is the permanent nucleolus, which stains with iron-haematoxylin, and is identical with the nucleolus of somatic nuclei. The second has the shape of a sickle and rests upon the other like a cap. It stains like chromatin. These two kinds of nucleoli always appear during late synapsis in *Neottia Nidus-avis*. During the two reduction divisions of the megaspore mother cell no walls are formed, and all four megaspores take part in the development of the embryo sac. The two antipodal nuclei do not divide again, but the other two enlarge and divide, so that there are four nuclei at the micropylar end of the sac. They develop a typical egg apparatus and a polar nucleus. One of the male nuclei fuses with the egg nucleus and the other with the micropylar polar nucleus. As the young embryo develops, four free nuclei are found in the embryo sac, one of them a synergid nucleus, the two antipodal megaspore nuclei, and the nucleus formed by the fusion of a sperm with the micropylar polar nucleus. There is no free nuclear division or any formation of endosperm.—C. J. CHAMBERLAIN.

Sporidial infection in Puccinia graminis.—A recent contribution to the series of studies in the physiology of parasitism emanating from the Imperial College of Science and Technology (London) is by WATERHOUSE,[18] describing

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[17] MODILEVSKI, J., Cytological and embryological studies on *Neottia Nidus-avis*. pp. 55. *pls. 1, 2.* 1918.

[18] WATERHOUSE, W. L., Studies in the physiology of parasitism. VII. Infection of *Berberis vulgaris* by sporidia of *Puccinia graminis*. Ann. Botany **35**:557–564. *figs. 19.* 1921.